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were in a standing posture. The largest tree was forty-six feet long and four feet and a half in circumference. The trees were generally found in a dark loamy soil composed of the disintegrated underlying rocks at a depth varying from low-water mark, to sixteen feet below low water.——It is encouraging to notice the improved facilities for botanical study and teaching in our colleges. At Michigan Agricultural College, a building 46 by 66 feet, and two-stories in height was erected in 1879, for the department of botany. The large lecture-room, 44 by 48 feet, is provided with tables for laboratory uses also. A large room on the second floor is designed for the herbarium and cabinet. At the Iowa Agricultural College new and more commodious rooms were provided for the botanical department by the erection of North Hall, in 1880. A large lecture-room is supplemented by a laboratory adjacent to it. The latter is constructed with north and east windows for microscopic work. A third room of ample size is set apart for the herbarium and cabinet.——Ten new species of Carices are described in the recently published second volume of the "Botany of California," by Wm. Boott, who contributed the article on Carex.——M. E. Jones in an article on the wild fruits of Utah, in Case's *Botanical Index*, mentions fourteen species; among these is a curious wild peach which grows in the sand and on lava beds. A wild gooseberry, *Ribes divaricatum*, var. *irriguum*, and a raspberry, *Rubus leucodermis*, would probably be hardy in the Eastern States; their fruits are described as delicious.

ZOÖLOGY.

DREDGINGS IN THE BAY OF BISCAY.—The following are some of the more important results to which M. A. Milne Edwards directs attention. The Crustaceæ were, he says, extremely interesting; not one of the specimens dredged is also littoral in habitat, and it seems as though there were two faunæ placed one above the other, and not mixing. He forms a new genus, Scyramathia to contain *Amathia carpenteri* and *Scyra umbonata*; a crab with phosphorescent eyes was found at various depths between 700 m. and 1300 m. *(Geryon tridens)*; this has been already seen in the Norwegian seas. *Munida tenuimana*, with large and phosphorescent eyes was not rare. *Gnathophausia zœa*, which has only as yet been collected by the *Challenger* (off the Azores and near Brazil) was also met with.

Most of the Mollusca belong to the deep-sea fauna of the North Atlantic and of the Arctic seas. Among the Mediterranean forms, there were some which as yet have only been found in the fossil state. The similarity of the deep-sea fauna at different latitudes is very strikingly shown by this collection. Pteropoda were taken from all depths; indications of Heteropoda were not absent. A short list of the more important Mollusca obtained is given by M. Milne Edwards in a foot note.

Chætopod worms were abundant at all the stations; a species of the remarkable Chætoderma was also taken; two or three genera of Gephyrea were met with, and several of the forms had a resemblance to the Arctic species.

A new species of Edwardsia (or Hyanthus), a beautiful red Adamsia, a large Bunodes, and a new species of Flabellum represent the most striking Zoantharia; the Alcyonaria are reported to be very remarkable, and among them was a specimen of the rare Umbellularia.

The Echinodermata appear to form the most valuable part of the collection; there is a new species of Phormosoma, which is to be distinguished from *P. placenta* by the ornamentation of the plates, and by its large spines on the oral surface, *Pourtalesia jeffreysii.* Two new and remarkable Spatangoids make up the chief Echinid gains. The Asterida were all interesting and rare, but above all we have to note the capture of *Brisinga coronata,* which was taken at several stations. Among the Ophiurids, which were abundant, there was found one which, not described, is said to be probably the representative of an absolutely new type. There are some new and fine species of Holothurioida. Among the Crinoids we find only two examples of an Antedon, allied to *A. sarsii* of the Northern seas. Hyalonema, Holtenia, Farrea, &c., were among the siliceous sponges.

Large specimens of *Orbitolites tenuissima* and a magnificent series of arenaceous forms are to be noted among the Foraminifera.

In some cases the dredge descended to 3000 metres, and in addition to the zoölogical collections, there have been made observations of very considerable importance on the hydrographical relations of the sea-bottom of this region.

FAUNA OF THE LURAY AND NEWMARKET CAVES, VIRGINIA.—Last June I visited these caves in order to compare their fauna with that of Weyer's cave, situated farther south in the Shenandoah valley, which I had examined in 1874, with excellent results, having found between fifteen and twenty species of Arthropods, where no life had before been known to exist.

Newmarket cave, situated about three miles south of Newmarket, was first visited, and a hasty examination revealed the following forms:

Spirostrephon copei Pack. Several specimens prove to be exactly like those from Weyer's cave; individuals from the two caves (as well as from Luray cave) only differing from those of Mammoth cave, Ky., in having shorter hairs.

Linyphia. Webs of a small spider, probably *L. weyeri* Emerton, were common on the stalactites, but the spiders themselves were not detected. A small, long, narrow mite also occurred, and what is probably a new species and genus of false scorpions; it was blind, and quite different from Mammoth cave specimens of *Chthonius packardi* Hagen.

Among insects a single cricket (*Ceuthophilus maculatus* Harris) occurred not far from the entrance, and a beetle with eyes (Cryptophagus sp. indet.) which had probably been carried in by the men at work on the stairways and walks; also two small flies, while the true cavern fly which we have found in caves in Kentucky, Indiana and Utah was common; we refer to *Blepharoptera defessa* Ostensacken. Of Thysanura, two species occurred; a pale whitish-red Smythurus, with pale reddish eyes, and faded whitish specimens of *Tomocerus plumbeus* (Linn.) of the same color and appearance as those collected by us in the Carter caves, Kentucky. The body was nearly white, the antennæ darker, the eyes black.

The Luray caves, in Luray valley, were less populous in the parts fitted up for visitors, owing undoubtedly to the recent walks and stairways built by the proprietors. Spiders were numerous, however, all belonging to one species, *Linyphia weyeri* Emerton; they differed only from the type specimens in having rather smaller eyes. *Spirostrephon copei* was less common than in the Newmarket cave. The fauna of these caves was essentially like that of Weyer's cave. The writer would add that he is collecting materials and intends soon to publish a monographic account of the cave fauna of the United States, in the reports of the Kentucky Geological Survey, under whose auspices most of the material has been collected; and would be grateful for the loan of specimens.—*A. S. Packard, Jr.*

A RARE FISH IN ILLINOIS.—A specimen of Chologaster in the collection of the Illinois State Laboratory of Natural History, was obtained by Mr. F. S. Earle, of Cobden, Illinois, in August, 1878, from a spring at the foot of a bluff, in Western Union county, in the southern part of Illinois.

The description of *Chologaster cornutus* Agassiz, was based on three specimens from South Carolina, and that of *C. agassizii* Putnam, on one from Tennessee;—these four specimens being apparently all that were known at the time of the publication of Mr. F. W. Putnam's synopsis of Heteropygii, in 1871.

The Illinois specimen differs materially from the others, but as it is intermediate in several particulars between the two described species, and as specific descriptions drawn from so small a number of individuals must have a very uncertain value, I will give an account of this specimen prepared by comparison with the descriptions of Putnam's synopsis, without attempting to decide whether it belongs to a new species or whether it unites the two previously proposed. Head in body, without tail, 3½ times; the eye is above and well behind maxillaries and is contained about six times in head; the pectoral fin reaches half way to the dorsal; the color is precisely as in *cornutus*, except that the middle stripe, dark on the head, is decidedly *paler* than the ground color on the body, the change being abrupt at the opercular margin. The caudal fin is dark-brown, with several rows of white specks or blotches running across the rays. The anterior part of the dorsal is similar in color, but paler. Total length a trifle over an inch. A scale from the region mentioned by Mr. Putnam, is similar to that of Agassizii, but shows five or six concentric lines and three radiating furrows.

This specimen thus agrees with *C. cornutus* in position of eye and plan of markings; with *C. agassizii* in length of pectorals and structure of scales; is intermediate in length of head, and agrees with neither in the color of the caudal and dorsal fins and the tint of the middle band.—*S. A. Forbes, Normal, Ill., Jan.* 3, 1881.

THE JAPANESE LAP-DOG.—This species of *Canidæ* was characterized in the Proceedings of the Philadelphia Academy for 1879 (July), under the name of *Dysodus pravus*, and the diagnosis was based on four skulls and one skeleton. In the NATURALIST, for 1879, p. 655, appeared notes on three living specimens examined by the writer in San Francisco, which confirmed the characters previously ascribed to the genus and species. Subsequently I had the opportunity of examining eight additional specimens in San Francisco, of which three were born there, and two certainly and others are probably, Japanese born. The characters of these are as follows:

No. 1. Premolars $\frac{2}{2}$, molars $\frac{1}{2}$; first premolar a minute cusp; two years old; Japanese.
No. 2. Premolars $\frac{3}{3}$; first and second superior minute.
No. 3. Premolars $\frac{4}{3}$; first and second superior minute cusps; first inferior do.; nine months old; American born.
Nos. 4 and 5. Exactly like No. 3.
No. 6. Premolars $\frac{2}{2}$; an old dog from Japan.
No. 7. Premolars $\frac{2}{3}$; young; daughter of No. 6.
No. 8. One-half poodle; premolars $\frac{2}{2}$; molars $\frac{1}{2}$; four and a half years old.

From the above it can be seen that the absence of the first inferior premolar is constant, as is also, I may add, the absence of the last inferior true molar. In only three specimens was the first superior premolar present, and then as a cusp-like rudiment; and these are young dogs American born. The tooth is doubtless shed before maturity. Finally, even the poodle mixture did not restore the two lost inferior molars; and two superior molars are also missing, as in the typical *Dysodus pravus*. In all, the superior incisor teeth were present. Thus, though this species shows a remarkable tendency to shed the molar teeth with age, its normal dentition, when perfectly preserved, differs materially from that of the genus *Canis*.

This species has some marked peculiarities of habits. It does not appear to possess the senses of sight or smell in the same degree as the species of *Canis*. It cannot follow its master through a crowded street, and is readily lost, even on open ground where opportunities for sight are good. As house dogs they are cleanly, and intelligent in certain directions. They do not learn tricks easily, but seem to understand the disposition and wishes of their master very readily. They are often very vivacious and energetic, and not at all indisposed to use their canine and flesh teeth on persons whom they do not especially regard. —*E. D. Cope.*

THE EPIDEMIC AMONG MARINE FISHES.—In the year 1878 the pages of *Forest and Stream*, as also the Proceedings of the National Museum, contained notices of a remarkable mortality among the fishes and marine animals of the Gulf of Mexico, the quantity of fish perishing being something truly enormous. This year the same phenomenon is repeated and the Florida papers contain many notices on the subject.

It is considered a matter of so much importance that the National Board of Health has detailed Doctor Ginteras to visit the region and make a thorough investigation in regard to it.

Among the various communications that have reached the Smithsonian Institution, I inclose one of the most detailed, from an extremely intelligent observer, a resident on the west coast of Florida. At present the cause of the evil is unknown, but a careful comparison of the data, supplemented by the special investigations of the Board of Health, may enable us to solve the problem. The occasion is a very serious one to the fishermen, and indeed to the people of the Gulf coast generally, as a vast amount of animal life, cast in a putrifying condition on the shores, must be a source of injury to the public health.

It is desirable that any observations of facts connected with this phenomenon should be published.

SPENCER F. BAIRD, *Commissioner.*

Statement of Mrs. Charles Hoy, of Little Manatee: "The fish began dying here about the first of November. About 8 o'clock on the evening of October 28, or thereabout, I was sitting on my front gallery, the air being perfectly still, and the bay calm, when I heard a heavy splashing of the water in the direction of Gadsden point. This continued for a few minutes, and was immediately followed by a roaring sound, such as might be made by the wheels of a side-wheel steamer near at hand, though the noise seemed to be several miles away. This continued for about a quarter of an hour, as near as I could guess, when it suddenly ceased. Some twenty-five or thirty minutes afterward, heavy swells began to come up the river, such as come in during a heavy blow from the north-west. These continued for a long time, gradually becoming lighter until I went to bed. In three days the fish began to come up the river dead and dying. I caught several mullet that were standing upright in the water sick, and each had three black spots on the back, which gradually faded away. I opened the fish, and could see nothing the matter with them. The flesh was natural and firm, and the gills were normal.

"In regard to oysters I have had a rather rough experience, and can with certainty say that they are poisonous. A few days after the fish began dying, I had a quart of fine oysters for dinner. I had a lady visitor on that day, but she did not like oysters, and ate none. My daughter and I ate heartily of them, and after dinner I took my gun and went out to a pond to shoot some ducks. I took a colored woman (my cook) along, and before I had gotten half way I began to feel weak, and a mist came before my eyes. I kept on, however, to the pond, and when I reached it, I was so blind I could not see the ducks, although the water was covered with them. With the assistance of the colored woman, I got home, when I found my daughter similarly affected, and unable to walk. Neither Mrs. Simms, the visitor, nor my cook were affected, which makes me know it was the oysters. The sickness and loss of vision gradually left us after drinking a cup of strong coffee. I am confident the death of the fish is caused by the discharge of poisonous gases from the bottom of the sea."—*Forest and Stream.*

CARACAS (Venezuela), November 12, 1880.

THE LAC INSECT.—In addition to Mr. J. M. Stillman's article on "The origin of the Lac," (AMER. NAT., Nov. 1880, p. 782-787), I may be allowed to say that H. L. Carter published a rather full life-history of the Lac insect in the *Annals and Magazine of Natural History*, 1861. There exists also a special work, by J. E. O'Conor, under the title "Lac; production, manufacture and trade," a revised edition of which was printed in Calcutta in 1876, 8vo, pp. 83. It contains Carter's article in the appendix. Both confirm of course Mr. Stillman's observation that the lac is a secretion of the insect, and O'Conor mentions thirty-five trees on which it has been found. The best lac is said to be found on the *Butea frondosa*, *Ficus religiosa* and *Schleichera trijuga.*

I think Messrs. Trübner & Co., 57 and 59 Ludgate Hill, London, can furnish O'Conor's book, which is one of the official publications of the Indian government. In the number for September, 1880 (page 669) of the AMERICAN NATURALIST, my article on the fertilization of *Cobæa penduliflora* (published in *Nature*, June 17, 1880), is mentioned; but with the curious addition, that it "confirms Bonnier's statement that the nectar is of no direct use to the plant." Now Bonnier, as is well known, holds just the opposite opinion, whilst I certainly gave the case of the *Cobæa* as a relevant proof against the view he has lately tried to defend in the botanical part of the *Annales des Sciences Naturelles.*—*A. Ernst.*

DEEP-WATER FAUNA OF THE SWISS LAKES.—Dr. Asper gives a brief account of his investigations into the fauna of eleven of the Swiss lakes.

That of the Lake of Zurich would appear to be very rich. The Mollusca are represented by various genera, and those delicate Cyclads, the Pisidia, are always present. The larvæ of Diptera were also numerous. Living in small tubes formed from the slime, they are either colorless or of an intense yellow or red color; they chiefly belong to the genera Chironomus and Tanypus. Acarida were nowhere completely absent. Vermes were richly represented, and chiefly by species of Lumbriculus and Sœnuris. Of the latter genus great quantities were observed. There was also a colorless Hydra. In the Lake of Luzerne seventy specimens of what appears to be *Asellus forelii* were taken at one dredging. Here, again, Lumbriculids and Dipterous larvæ were very abundant. In the Lake of Sils (Engadine), to omit many points of interest in other lakes, the Hydroids appear to be especially remarkable. A new species is described and figured by the author under the name of *Hydra rhœtica*. Of a bright red color, and often as much as 1½ cm. in size, it gives indications of forming buds which remain permanently attached to it, and so give rise to a colony. The male and female individuals can be easily distinguished. The fauna of this lake was very rich in individuals, though comparatively poor in species.—*Jour. R. Microscopic Society*.

THE POISON APPARATUS OF SPIDERS.—M. Jules MacLeod has recently published in the Belgian Archives de Biologie, the results of his studies on this subject. He finds that each of the venomous glands of spiders is formed of a pyriform sac, the walls of which, provided with a muscular layer, are lined within with an epithelium, the cavity of which serves as a reservoir of the poisonous fluid. From the anterior part of this sac proceeds a canal which opens at the end of the cheliceres, or jaws. The wall of this canal contains the same parts as the wall of the sac, but the muscular layer is there, however, either much less developed or absent. The secretory cells are cylindrical, arranged in a single layer. These cells present a different aspect according to their state of repose or activity; they pass from the state of ordinary cylindrical cells (repose?) to that of cup-shaped cells (activity?) by a series of states of passage. In certain species there are only cup-shaped cells (Tegenaria), of which the cup, much elongated, plays the rôle of excretory canal.

This last form approaches the typical unicellular glands; consequently the glands whose cells presents this disposition are, properly speaking, compound glands (Tegenaria).

DEEP DREDGINGS IN THE LAKE OF TIBERIAS.—The invertebrata obtained by M. Lortet in these dredgings include ten species of Mollusca, of which three are new to science. These are named by M. Locard, *Unio lorteti*, *U. pietri*, *U. maris galilæi*. The other species are *Unio terminalis* and *tigridis*, *Cyrena fluminalis*, *Neritina jordani*, *Melania tuberculata*, *Melanopsis præmorsa* and *costata*. The three latter shells give the fauna a marine appearance; and it is to be considered as a transition fauna between salt and fresh water, the lake having probably been originally salt, and subsequently altered by the passage of the Jordan waters through it. Near the shore were found a small shrimp, and the crab, *Telphusa fluviatilis*. A very fine volcanic mud from the greatest depths contained diatoms, foraminifera, &c. No alga was brought up.

The Unio shells at the depth of 250 metres were curiously softened and resembled in condition the fossils of some of the Tertiary strata of the middle of France; this is probably chiefly due to pressure.

FRESH-WATER MICROSCOPIC ORGANISMS.—Prof. Maggi has published a catalogue of the Rotifera of Volconia, containing fourteen genera and eighteen species. He also gives a list of the fresh-water Rhizopoda of Lombardy, and has come to the conclusion that *Amphizonella flava* is not identical with *Pseudochlamys patella*, but that it is a developmental stage of some unknown form. He has investigated the plastids found in ciliated Infusoria, and especially those which are found in the nuclei of the Oxytricha. When these organisms are treated with a two per cent. solution of bichromate of potash, dark granulations are to be observed in the parenchyma of the body, and a black reticulum is also to be made out in the nuclei.

ZOOLOGICAL NOTES.—The classification of the order of Discomedusæ (Discophora), of which the common Aurelia is the type, has been discussed by Haeckel in a preliminary way in the Proceedings of the Society of Medicine and Science of Jena. He divides the group into three sub-orders. He regards as the stem or ancestral genus of the order, Ephyra, a form similar to the larval Ephyra (Ephyrula) through which most of the species of the group pass. It will be seen from this that Haeckel does not regard the Trachynemidæ or the Lucernariæ as forming sub-orders of the Discophora, but independent orders. The discovery of a large number of new forms has led him to propose this new classification of the order.——Some points in the structure of the herring are discussed by Professor Moebius in the reports of the commission for the scientific exploration of the German seas, comprising figures illustrating the external and internal anatomy of this fish, and its crustaceous food, as well as the appearance of the fish at different ages; and a comparison of the herring with the spratt. He also gives a figure of a young flounder, and notes on the food of fishes and their mode of reproduction.——An elaborate work by Dr. R. Latzel, favorably noticed in *Nature*, on the Myriopods of Austria, is being issued in parts at Vienna; the first part comprises the Chilopoda; we notice that the author adopts Mr. Ryder's new order Symphyla for the synthetic form Scolopendrella.——Professor Huxley lately read a paper before the Zoölogical Society of London, on the application of the laws of evolution to the arrangement of the vertebrates and more particularly of the mammalia.——In a paper read by M. Viallanes, before the French Academy, on the sensitive nerve-termination in the skin of some insects, especially the larvæ of the common fly (Musca) and Eristalis, he finds under the hypodermis an extremely rich plexus of ganglionic cells, connected on one hand with the chief nerve-centers, and on the other with sensitive terminal nerve-branches.——In a paper read at the same meeting by M. Jourdain, on the sensorial cylinders of the internal antenna of crustaceans, he states that while these have undoubtedly the characters of an organ of sense, they cannot be those of smell. ——Mr. W. H. Ballou, in the *Chicago Field*, gives an account of the fisheries of eels in the Oswego river, New York, and a good account of the habits of the fish.——Mr. B. B. Redding of the California Fish Commission, recently read an article on the propagation of fishes before the Academy of Sciences of that State. He dwelt especially on the enormous fertility of fishes as an indication that the sources of supply of human food were only beginning to be appreciated, and that the limit of human population as set down by the Malthusians is as remote as it ever was. ——M. Bocourt of the Commission Scientifique de la Mexique, has recently investigated the structure of the scales of the Scincoid and other lizards with fish-like scales. He finds the former to be perforated by canals which divide the scales into numerous areas. The similar scales of *Tretioscincus*, *Gymnophthalmus* and allies from tropical America are homogeneous in structure.

ENTOMOLOGY.[1]

NOTES ON THE GRAPE PHYLLOXERA AND ON LAWS TO PREVENT ITS INTRODUCTION.—I have received the following letter from a well-known grape grower of St. Louis, Mo., who is largely engaged in the exportation to France and other countries of American grape-vine cuttings, and as it touches a question of deep general, even international, interest, I will make it the text for brief comment.

"* * * On page 3 of your *American Entomologist*, you urge the grape-growers of California not yet afflicted with Phylloxera to exercise 'the utmost vigilance to prevent the introduction into their own localities of infested vines or cuttings.' This last word, to me at least is unsatisfactory. Why should you support that erroneous prejudice? Is it not true that in winter, when cuttings are made and shipped, it is impossible to find a live Phylloxera on them, or any eggs of this insect? The winter-egg, if it exists at all, does not exist on one year old wood, certainly not here nor in Southern France. Ask Aimé Champin; ask Leenhardt, Robin, Planchon, even; they all looked for it in vain just as you did yourself. * * * But while Spain, Italy, Hungary work to get the prohibition of the importation of cuttings repealed, as necessary to their salvation and free from any danger of importing the destructive insect, such a word from you may frustrate their endeavors. ISIDOR BUSH."

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[1] This department is edited by PROF. C. V. RILEY, Washington, D. C., to whom communications, books for notice, etc., should be sent.